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*The Convergence of Price-Cost Margins**

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Résumé

Cette étude a pour but d'estimer l'évolution des markups de treize pays de l'OCDE au cours des trente dernières années. Elle conclut à une faible, et hétérogène, augmentation des marges prix-coûts en moyenne, contrairement à l'effet généralement attendu de l'augmentation de la concurrence. Plus nettement, elle met en évidence la convergence des marges, à la fois entre les pays et entre les secteurs. Cette convergence signifie que les marges initialement élevées ont baissé et celles initialement faibles ont augmenté. Ces tendances semblent liées à la baisse de la part des salaires dans la valeur ajoutée. Elles suggèrent de chercher des facteurs contrebalançant l'effet pro-concurrentiel sur les markups.

Mots clés : Markup, Marge prix-coût, Effet pro-concurrentiel, Négociations salariales, Part des salaires

Abstract

This paper gives estimates of sectoral markup trends in thirteen OECD countries over the last three decades. It concludes with a slight, albeit heterogeneous, increase in price-cost margins (PCMs) overall, contrary to the generally expected effect of increased competition. More strikingly, it establishes a clear pattern of PCM convergence both across countries and sectors. This convergence means that high margins have shrunk and low margins grown. These movements seem to be linked to the decline in the labour share. They point to a need to search for factors counterbalancing the pro-competitive effect on markups.

Keywords: Markup, Price-cost margin, Pro-competitive effect, Wage bargaining, Labour share

JEL Classification: L11, L13, L60, J40, F02

1. Introduction

The usual expected positive outcomes of increased competition in the goods markets refer to the stimulation of long-term productivity growth on the one hand, and to a lowering of distortions from imperfect competition, the so-called pro-competitive effect, on the other. At first sight, the stylised facts pointing to slowing productivity growth and more or less stable corporate profit ratios over the last thirty years in developed countries do not seem to accord with the intensified competition exemplified by the take-off of international trade flows.

As the reciprocal dumping model of Brander and Krugman (1983) is a key theoretical block in establishing gains from trade due to the pro-competitive effect, wondering whether OECD price-cost margins (PCMs) did fall in a period struck by trade liberalisation and domestic deregulation is an important question, especially as most of the studies finding some empirical support for the pro-competitive effect focus on developing countries.[1] Chen, Imbs and Scott (2004) is one exception dealing with developed countries. Their results are much more convincing as regards the impact of international trade on productivity and inflation than on markups, as their sample with markups is short due to data constraints.

From another perspective, Sutton (1991, 1997) insists on the endogeneity of market structure, which entails a non-monotonic relation between the intensity of competition and the concentration ratio of certain types of industries, working through the exit of firms unable to keep the pace. His bound approach articulates a mechanism that leads to a weakening or even a reversal of the pro-competitive effect. Moreover, the impact of trade on market structure is central in the burgeoning literature on firm heterogeneity. Bernard, Eaton, Jensen and Kortum (2003) highlight that imports induce the exit of the least efficient firms, leaving only the most productive higher-markup firms in the market. Also, but not necessarily related, the merger and acquisition wave of the 'nineties gives an example of an endogenous reaction of firms aiming at improving their market power.

In September 2004, Volkswagen had just started a negotiation with the largest German union, IG Metall, with the declared objective of reducing labour costs by 30%. In a press conference, the

[1] Roberts and Tybout (1996) provides an extensive survey, which is enriched by recent papers including Krishna and Mitra (1998) for India and Pavcnik (2002) for Chile.

carmaker's Director of Human Resources said: "Times have changed, we need new and creative solutions. […] We cannot isolate ourselves from the situation of worldwide competition".[2] The current debate, particularly in France and Germany, about the extension of the working week, without proportional labour compensation, has brought the interactions between product market competition and the balance of power in the labour market to the forefront.

There is now an extensive literature recognising that wages are partly determined by rent sharing. Oliveira Martins (1994) insists on market structure to infer the impact of international trade on wages. Moreover, Borjas and Ramey (1995) establish both the presence of significant rents captured by workers and the negative impact of imports on wages in concentrated sectors, especially those of lower educated workers, whereas Fontagné and Mirza (2001) also examine the positive effect of exports. Recently, Kramarz (2003) shows that outsourcing weakens the bargaining position of high school graduates by limiting the availability of alternative jobs, and therefore concludes that competitive pressures reduce their wages.

Since competition affects rents, the substantial change in labour market institutions is likely to have played a role in PCM changes. Rodrik (1997) promoted the idea that globalisation, taken here as a distinct aspect of deregulation, might have lowered workers' bargaining power by increasing the substitution between domestic and foreign workers. Blanchard and Giavazzi (2003) develop a general equilibrium model to capture the outcomes of product market and labour market deregulations. They use it to shed light on one of the most striking movements over the last decades, the decline in the labour share within Continental Europe, which Blanchard (1997) emphasises forcefully. This decline apparently contradicts the pro-competitive effect. Blanchard and Giavazzi infer that the bargaining power of workers has most likely decreased since the middle of the 'eighties and show how product market deregulation may trigger labour market deregulation.

This study provides estimates of PCM trends over the last three decades at sector manufacturing level for thirteen OECD countries. It establishes that PCMs have not decreased overall. More specifically, it exhibits a strong pattern of PCM convergence across both sectors and countries. The linear

[2] Quoted from the newspaper Les Echos, 08/24/04, my translation.

correlation between initial PCMs and PCM changes is significantly negative, and the dispersion of PCMs across the 132 sectors studied fell by more than twenty percent between 1980 and 2000. These results are not totally new, as they meet the results of Domowitz, Hubbard and Petersen (1986) studying US manufacturing between 1958 and 1981 and Davies (2001) focusing on the changes in European concentration, but this pattern of convergence has been neither noticed nor even clearly displayed so far. Moreover, these trends seem to be associated with the decrease in the manufacturing labour share. How capital market integration and the decline in workers' bargaining power could account for these changes is also sketched theoretically. In particular, this decline would enable us to reconcile the expected impact of the pro-competitive effect, the slight increase in PCMs overall and the decrease in the labour share at sector level.

The paper is organised as follows. Section 2 proposes a framework that links markups, PCMs and assumptions regarding the adjustment of capital stocks. The econometric specification is then presented in Section 3, and results follow in Section 4. Section 5 provides a discussion *suggesting* potential effects counterbalancing the imports-as-market-discipline hypothesis. Finally, Section 6 gives some concluding remarks.

2. Price-cost margin and markup equation

As Schmalensee (1989, p.960) reminds us, Collins and Preston (1969) introduced the so-called PCM as the difference between revenue and variable cost, i.e. the sum of labour and material expenditures, over revenue:

$$PCM \equiv \frac{sales - labour\ expenditures - material\ expenditures}{sales} \qquad (1)$$

Many studies used PCM as the dependent variable in assessing the impact of concentration or import penetration on margins, among which Domowit et al. (1986) and most papers surveyed by Tybout (2003). What is the relation between PCM, as defined in equation (1), and markup to marginal cost?

The usual framework assumes that identical firms in a given sector have the following homogeneous production function:

$$Y = A.\ F\ (K, N, M) \qquad (2)$$

where *Y* is output, *K* capital, *N* labour, *M* materials and *A* a productivity term. If all factors adjust perfectly, μ denoting the markup over marginal cost and *x* the returns to scale, first order conditions and Euler's equation lead to:

$$P.Y = \frac{\mu}{x}.(R.K + W.N + Q.M) \qquad (3a)$$

where *P* is the price of output, and *R*, *W* and Q are the respective factor prices of capital, labour and materials. If capital is fixed, the first-order condition on capital is irrelevant, and the markup equation becomes:

$$P.Y = \frac{\mu}{x}.(W.N + Q.M) \qquad (3b)$$

provided that *x* is the returns to scale on the *variable* factors.[3] It is essential to note that the notion of markup we are interested in is not the tautological definition given by the ratio of output to total costs. Rather, it comes from first order conditions in profit maximisation and captures the idea of market power, i.e. the capacity firms have under imperfect competition to mark up *variable* costs in setting their prices at the desired level. If capital is fixed, at least in the short run, then costs related to capital will be fixed costs. They will impact overall profitability but will disappear from the markup equation.[4]

In any case, it is preferable to start from the more general markup equation,

$$PY = \nu.(WN + QM + h.RK) \qquad (4)$$

where *h* takes the value of *0* or *1* depending on the treatment of capital as a fixed or perfectly adjusting factor respectively, and to see whether our results differ in these two extreme cases, the real world lying somewhere in between. ν stands for the markup to marginal cost μ, adjusted for the returns to scale on the variable factors *x* : $\nu \equiv \mu / x$. Keep in mind that the prime goal of this study is to assess the markup *trends* over the last thirty years and not to estimate the markup *levels* precisely. Indeed, it may well be that, even though markup levels are sensitive to how capital is treated, markup changes are not. Moreover, insofar as economies of scale are constant, relative changes in adjusted markups ν equal relative changes in markups over marginal cost μ. In the general case, PCM is related to the markup adjusted for the returns to scale, $\nu \equiv \mu / x$, according to:

[3] Equation (3b) is therefore strictly correct only if the production function is homogenous in the labour and material inputs.

$$PCM \equiv \frac{P.Y - (W.N + Q.M)}{P.Y} = 1 - \frac{1}{n} + h.\frac{R.K}{P.Y} \qquad (5)$$

3. Econometric specification

The markup of interest to us is the desired markup, that is the level at which firms would ideally choose to markup their costs. It reflects structural parameters like the level of concentration in the industry, the intensity of competition, the demand elasticities. However, there are various reasons why observed markups may differ from desired markups. Observed markup may be impacted by transitory shocks and influenced by such economic events as price developments and cycles and therefore, the specification should control for these effects.

3.1. Price rigidities

A price shock will impact markups if there are rigidities, in the sense that prices are slow to adjust to changes in nominal marginal costs. At the macroeconomic level, for the period under study, the oil price shocks have had major impacts on observed markups resulting in distortions of value-added sharing between factor shares and profits. Among numerous reasons are: unexpected price developments, wage indexation, price stickiness, adjustment costs, terms of trade effects. It is well known that for continental Europe, especially France and Italy, wage indexation during the two oil price shocks resulted in an increased labour share and a squeezing of corporate profits and markups.[5]

Rotemberg and Woodford (1999) present a model with sticky prices and show that the slowness of prices to adjust to changes in marginal cost leads to a negative relationship between current inflation and the difference between observed and steady-state markups. To illustrate this simply, assume that output price p_t for time *t* adjusts to the desired level p_t^* according to:

[4] In a methodological paper, Boulhol (2005) compares the usual markup estimates based on the price-based or dual Solow residual (Roeger,1995) with straight measures of the ratio of output to costs , and points that the data clearly leans towards the fixity assumption. Capital measurement issues are secondary.

[5] However, in a study focused on US sectors and based on a VAR model, Rotemberg and Woodford (1996) asses that an increase in markups during the oil shocks is the most consistent scenario explaining both the magnitude of the decline in output and the decrease in real wages they observe. They have on mind a representation where markups are endogeneous and "propose that oil price increases lead to *increases* in desired markups". In their case, the markup desired after a temporary shock differs from the steady-state markup.

$p_t = (1-b).p_t^* + b.p_{t-1} \Leftrightarrow p_t \approx p_t^*.(1-b.p_t)$, where p_t is the inflation rate. Because of price rigidities ($b \neq 0$), the observed markup, n, differs from the desired one, n^*, is negatively related to inflation and even more so, the slower the prices adjust:

$$n \equiv \frac{pY}{(WN + QM + h.RK)} \approx \frac{p^*Y}{(WN + QM + h.RK)}.(1-b.p) = n^* - b.p \quad n^* \qquad (5a)$$

or $$Log\, n \approx Log\, n^* - b.p \qquad (5b)$$

In order to control for this distortion due to price rigidities, the change in the GDP deflator, *DEFL*, is included in the regressors. In addition, in order to account for the oil price shocks specifically, two variables are built: *OIL1* is the (log of the) price of WTI barrel (source OECD Economic Outlook) expressed in local currency and deflated by GDP prices; *OIL2* is the share of oil consumption in total GDP (constructed from the number of barrels consumed, source OPEP) times the change in real oil prices over the last five years. The main justification for using *OIL2* lies in the decreased dependency of energy consumption on oil over the last two decades.

3.2. Cyclical behavior

Because of its importance in the drawing up of macroeconomic policies, an abundant literature deals with the cyclicality of markups but whether markups are pro- or contra-cyclical remains unresolved. Obviously, the cyclicality relates to the observed markups. It is mostly due to mismeasurement of factor services but does not concern the true or desired markups which depend on structural parameters only. Rotemberg and Woodford (1999) provide some detailed explanations, both empirical and theoretical, including overhead labour, adjustment costs and labour hoarding, in support of the counter-cyclicality of markups. The cycle impact is controlled for, at sector and country levels, by the introduction of two variables. At sector level, following Bils (1987), the annual change in employment is used for the cycle variable, and *EMPCYC* is the de-trended series using a Hodrik-Prescott filter. At the country level, the output gap, *GAP*, from the OECD 2003 Economic Outlook, is used.

3.3. Specification

Finally, the logarithm of the markup n_t, is represented by a polynomial of time. The order of the polynomial was limited to two *ex post*, as greater numbers did not impact the estimates significantly. Due to data limitations, constraints had to be imposed: the macroeconomic variable (*DEFL*, *OIL1*,

OIL2 and *GAP*) effects were pooled across sectors for a given country, and thus the estimation is run at the country level. Therefore, the full specification is the following, where *i* indices country, *j* sector and *t* time:

$$Log\left(\frac{PY}{WN+QM+h.RK}\right)_{ijt} = Log(\mu_0)_{ij} + b_{ij}.(t-t_0) + c_{ij}.(t-t_0)^2 + l_i^{DEFL}.DEFL_{it} + l_i^1.OIL1_{it} + l_i^2.OIL2_{it} + \nu_{ij}^{EMP}.EMPCYC_{ijt} + \nu_i^{GAP}.GAP_{it} + u_{ijt} \quad (7)$$

where all RHS variables are taken as their respective difference to a reference point $t_0 = 1980$ and the estimated markup is given by: $Log(\mu_t)_{ij} = Log(\mu_0)_{ij} + b_{ij}.(t-t_0) + c_{ij}.(t-t_0)^2$.

Data for this study is from the OECD STAN database and is described in the Appendix. Note that the averages across sectors presented in the following tables are unweighted, i.e. treating each equally, because our prime interest lies in the mechanisms at work rather than in the impact for the total economy.

4. Results

The results presented below correspond to the case of quasi-fixity of capital ($h = 0$) and sub-section 4.6 returns to the question of the sensitivity to capital treatment. In this case, the dependent variable, the logarithm of markup, is very close to the PCM according to equation (5):

$$Log(\mu) \equiv Log\left(\frac{1}{1-PCM}\right) \approx PCM \quad \text{and} \quad \frac{\Delta\mu}{\mu} \approx \Delta PCM$$

as observed PCMs average 0.102 in the sample, over country, sector and time, from a (-0.021, 0.201) range. Therefore, markups and PCMs can be used interchangeably. In order to summarise the results, changes through time are often represented between two reference points, one common to all time series, 1980, the other being the last available point, 2000, except for Canada and Sweden, 1996, and the UK, 1998. Residual analysis indicates the need to correct for auto-correlation at the second order.[6]

4.1. Observed aggregated manufacturing price-cost margins

Figure 1 plots *observed* PCMs at the aggregated manufacturing level for the thirteen countries. The nice characteristic of PCM is that it does not suffer from any aggregation bias: aggregated PCM is just the average PCM of all firms weighted by their share in output. From the graphs in Figure 1, only Japan's aggregated PCM appears to have followed a downward trend. Let us turn now to sectoral data.

4.2. Variance analysis

A crude variance analysis of the dependent variable in equation (7) on country, sector and time fixed effects reveals that the explained variance (45%) comes mostly from the sector dimension, accounting for 48% of it, then the country, with 41%, and finally time, with the remaining 11%. The prevalence of sector is not surprising given that markups are mostly determined by market structures, which should be similar for a given sector across OECD countries, but may vary substantially across sectors. The heterogeneity in the country space likely reflects differences in goods and labour market regulations. Finally, the analysis of the 11% time share is the main focus of this study.

4.3. Prices

Table 1 shows that price changes and observed markups are estimated to be negatively linked: a decrease in inflationary pressures induces larger (observed) markups.[7] This is consistent with price stickiness, as illustrated in equation (5), forcing firms to cut their margins in the face of unfavourable cost developments. However, the variable *DEFL* is significant for only 4 of the 13 countries at the 5% level, which is likely to be due to the correlation with oil price variables over the period. When it is significant, it implies that a decrease of 10 points in the GDP deflator, not uncommon since 1980, leads to a 1%-2% increase in observed markups. Moreover, the two oil price variables are jointly very significant. Oil price changes between 1980 and the end period entail, beyond the *DEFL* impact, an average increase of 0.7% in observed markups for all countries, ranging from -0.6% for the UK - the only negative point - to 3.8% for Japan, very dependent on oil. Overall, disinflation between 1980 and 2000 has triggered an average transitory increase in markups of 1.3% across countries.

[6] Estimates are produced from an AR(2) process for the residuals, the correlation parameters being specific to the (country x sector) couple. Although it corrects for auto-correlation successfully, a more general treatment would have consisted in an error correction model, which allows to distinguish the short term from the long term dynamics.

4.4. Cycles

At the *sectoral* level, although the estimates are weakly significant, they confirm the counter-cyclicality of markups, stressed by Rotemberg and Woodford (1999) and supported empirically by Bils (1987) and Oliveira Martins and Scarpetta (2002) among others. Over the 132 sectors, the parameter n^{EMP} is negative in 92 cases, being significant at 10% level in only 32 sectors against 16 when positive. On average per country (Table 1), the effect of *EMPCYC* is counter-cyclical for 10 countries, pro-cyclical for 2 only and neutral in the case of the USA. Overall, a cycle materialising in an increase of 1% above trend in sectoral employment induces a decrease of 0.07% in the markups.

The estimated impact of the *macroeconomic* cycle, through the *GAP* variable, is more robust and clearly leans towards the pro-cyclicality of markups. This may be due to some externality in demand and is consistent with the observed pro-cyclicality of accounting profits. From the latter observation, scepticism about the counter-cyclicality of markups is implied in Christiano, Eichenbaum and Evans (1996). On balance, these estimates may provide an explanation for why the debate concerning the cyclicality of markups remains unresolved. There may be a supply-driven counter-cyclical partial equilibrium effect dampened by a pro-cyclical general equilibrium one. Table 1 indicates that, on average across countries, an increase in the output gap of 1 point of GDP results in an average increase in sectoral markups of 0.20%. Note that, although the average sensitivity is three times larger than the *EMPCYC* one, employment at the sectoral level could fluctuate much more than the output gap at the country level.

4.5. Estimated markups

Once controlled for price and cycle effects, one can focus on the estimated markup changes. First, changes through time are significant: the assumption that there is no markup change over the period is rejected for 82 of the 132 sectors at the 1% confidence level and for 93 of them at 5%.[8]

[7] Blanchard (1997) finds the same relation, although according to his footnote 41, the introduction of lags of adjustment of factor proportions leads to a weaker relation.

[8] Wald test on *b* and *c* parameters of equation (7).

Second, the general result points to a slight average increase of 1.4% from 1980. This means that on average, given the last row of Table 1, the observed markups increased by 2.4%, 1.0% being due to the temporary effects of cycle and disinflation. Table 2 provides the details per country and sector, the first column being the estimated markups in 1980 (the precision is good as the standard deviation of the parameter estimate varies from 0.006 for Belgium to 0.014 for Norway on average) and the second reporting the relative change between 1980 and the end of the period. Among all the sectors, 76 post a markup increase from 1980, with an average increase of 5.5%, whereas for the 56 remaining sectors, the decrease averages -3.5%. All countries but Italy, Japan and Norway experience an increase on average. Sweden, starting from rather low markups in 1980, posts the greatest increases in all sectors but one.

This general picture is, to a large extent, surprising. Indeed, the widespread perception is certainly one which deems that competition has become fiercer over the last three decades, due to trade liberalisation and to extended domestic enforcement of competition rules. Numerous country case studies, focusing mostly on developing countries, identify that trade liberalisation has had a pro-competitive effect, reducing the distortions from imperfect competition. However, and more consistently with the results above, in an extensive analysis of the trends in the industrial concentration at the sectoral level in the European Union between 1987 and 1997, Davies (2001, Table5.1.2 p.38) concludes that concentration increases slightly on average.[9] Moreover, Broda and Weinstein (2004), using disaggregated data on imported products to the USA, found that the elasticity of substitution between varieties have decreased since 1972, from which they infer an increase in markups.

Result 1: *Markup changes over the last 25 years are mostly significant and are very heterogeneous across sectors and countries. On average, markups over marginal cost went up 1.4% from 1980. More sectors see their markups increasing, and those increasing change more in absolute terms than those decreasing.*

[9] When concentration ratios are weighted by sector size, there is a slight *decrease* in average concentration (Table 5.1.1). In either case, given the level of market power estimated here, the overall impact of concentration changes on markup changes would be less than one percent, based on a proportionate relation between elasticity and the inverse of Herfindahl index. Note however that the notions are not strictly comparable since Davies measures the concentration at the EU level. For instance in

The second result may be the most striking and highlights some form of PCM convergence within countries. On the one hand, high PCMs tended to go down over time, which is consistent with Oliveira Martins, Scarpetta and Pilat (1996), who use the same database between 1970 and 1992 and with Borjas and Ramey (1995) who study the impact of imports on rents in US concentrated industries. On the other hand, low PCMs tended to go up. The combination results in a robust PCM convergence, which is now illustrated in two ways.

First, Table 3 gives the Pearson correlation between the relative change in the estimated markup since 1980 and the estimated level in 1980 across sectors for each country. This correlation is negative for twelve of the thirteen countries in the sample. It equals -0.60 on average and is very significant overall and for six countries.

Second, one can directly turn to the data. For illustration purposes, Figures 2a to 2c chart the observed PCM trends in the case of France, sorting the sectors according to their ISIC number. In each of these charts, the convergence is clearly visible, with an increase in initially low margins, a decrease in initially high margins and a lower dispersion of PCMs over time.[10] In Figure 2a, the striking feature is the upward convergence of the "Textile, Leather and Footwear" PCM to the other sectors' PCMs. By the early 'eighties, the textile industry had already suffered from the competition of developing countries. Afterwards, the levelling off of the product quality restored profitability and is consistent with the increase in PCMs. In Figure 2b, the convergence is extreme in the middle of the 'eighties and the hierarchy of PCMs across sectors is reversed between the beginning and the end of the period. Finally, PCM trends in Figure 2c present a funnel shape, with the range between the lowest and the highest PCM being noticeably narrower in 2000 than in 1970, a common characteristic of these three charts.

However, I was unable to link the PCM changes to the sectoral typology developed by Davies et al. (1996), based on whether competition operates through price and/or advertising and/or R&D. Part of this failure probably comes from the high level of aggregation in the sample which does not allow for a

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the reciprocal-dumping world, markups and local concentration fall with market integration even though global concentration does not change or even might increase with exit of firms.

[10] From these charts, we might infer that the removal of price-control in France in the middle of the 'eighties has mattered.

clear differentiation of the sectors. However, even at the disaggregated level, Davies (2001, p.43) reaches a similar conclusion as regards concentration: "While our typologies […] continue to have some success in explaining inter-industry differences in the *level* of concentration, it does not appear that they have much explanatory power concerning changes in market concentration". Most interestingly, Davies also highlights the convergence of concentration ratios across sectors (Table 5.1.5).

Finally, Domowitz et al. report in their table 1 that, although the average PCM across the 284 US industries they study increases from 0.244 to 0.273 between 1958-1965 and 1974-1981, the standard deviation declines considerably from 0.058 to 0.033. This spectacular narrowing of PCM dispersion comes from the increase in PCMs of low concentrated sectors. Therefore, based on the new results displayed here, this convergence seems to follow a long term trend. As yet, the least we could say is that the economic literature has not paid enough attention to the forces behind such a development.

Result 2: *There is a strong convergence of PCMs through time across sectors within countries. This comes both from the decrease in initially high PCMs, which is consistent with the generally expected impact of intensified competition, and the increase in initially low PCMs.*

The markup convergence also appears clearly within sectors across countries. Table 4 shows that, although estimated markups increased in 7 out of the 11 sectors from 1980 as reported in the third column, the dispersion across countries decreased in 8 sectors (last column). Indeed as indicated in the last row, the standard deviation of estimated markups across countries decreased by more than 20% on average for all the sectors, from 0.049 in 1980 to 0.038 in 2000.

Result 3: *At sector level, markups are converging across countries.*

Combining the sector and country dimensions, the results indicate a global convergence of markups, as Figure 3 illustrates compellingly. Each diamond represents one of the 132 (country x sector) couples, the x-axis is the estimated markup in 1980, whereas the y-axis is the estimated markup change between 1980 and 2000. Moreover, regressing the log-difference of estimated markups

between the end period and 1980 on the 1980 markup and on country and sector fixed effects for the 132 sectors yields a parameter for the initial (1980) markup of -0.72, being very significant (Student of -11.3). It is as if we could write a conditional convergence equation:

$$Logm_{ijT} = (1-k)Logm_{ijt} + k.Log\overline{m}_{ij}$$

with $k = 0.72$, $T = t + 20$ years and $\overline{m}_{ij}$ being the long term markup of which the estimate is read from the fixed effects. To make the analogy with growth theory, there are both b -convergence $(0 < k < 1)$ and s - convergence, "big time".

4.6. Capital sensitivty

In the case of quasi-fixity, the average increase in PCMs might reflect an endogenous increase to restore profitability in the face for instance of higher real interest rates which weigh on fixed costs. However, when treating capital as a perfectly adjusting factor ($h = 1$), the slight increase in markups found on average is attenuated somewhat, but results pointing at various types of convergence are maintained. These conclusions are also robust to different computations of capital variables. In other words, although markup levels depend on the specification, markup changes are not really sensitive to this choice.

This suggests that capital changes are not large enough to have an impact on estimated markup changes, which is not too surprising given the low capital shares in total output. Moreover, when focusing on the sample with less aggregated sectors, the main results remain.

More generally, it is well known that the empirical literature has difficulties finding a significant role for capital in aggregated production function. For example, in the studies presented in Roberts and Tybout (1996), parameters for the capital-output ratio, included as a control variable in PCM regressions, are rarely significant, and can even have the wrong sign (as noted also by Schmalensee, 1989 p.973, and confirmed by Boulhol, 2005). As Tybout (1996, p.212) put it: "The role of capital-output ratios depends strongly on whether industry effects are included. If industry effects are left out, capital-output ratios have positive and significant coefficients. If industry effects are controlled, temporal variation in capital intensity is not significantly related to fluctuations in price-cost margins within industry". Obviously, the possibility exists that capital stock is a bad proxy for capital services,

as emphasised by Burnside, Eichenbaum and Rebelo (1995) for the cyclicality of capital inputs. It is beyond the scope of this study to overcome this complex issue, hence the conservative "Price-Cost Margins" in the title. However, the results are likely to extend to long-term markups, as given the share of capital costs in output of around 0.05-0.08, it would take a huge change in that share over time to invalidate the convergence pattern.

5. Discussion

The following discussion is illustrative only. The purpose is to provide *conjectures* consistent with the results established in the preceding section.

5.1. In search of counterbalancing effects to the imports-as-market-discipline hypothesis

The trimming of the highest markups fits well within the classical pro-competitive story. Increased competition, through facilitation of new entry or international trade for instance, lowers concentration and induces an increase in the perceived elasticity of demand faced by firms, triggering a fall in desired markups. Taking the case of identical firms as an example, any new entry leads to a percentage drop of the markup, which is all the greater in absolute term that the initial markup is high.

Second, through the lower bound approach, Sutton (1991, 1997) insists on the non-monotonic relation between the intensity of competition and the concentration of activity. When market structure is endogeneised, especially when competition operates not only through prices but also through R&D and advertising, more competitive pressure generates the scaling up of expenditures which leaves less profitable firms in operation. Their exit may entail a rise in average markup. Moreover, concentration also increases when firms react to the increased competitive environment through mergers or acquisitions. It may well be that the sectors with the lowest markups in 1980 were subject to such intense competition that the implied low level of concentration "could not" be maintained.

Although disentangling the impacts of the determinants of markups is beyond the scope of this study, the results put forward in Section 4 suggest that the reciprocal dumping model alone is probably not an adequate framework to assess gains from trade. Therefore, if an economist wants to analyse the

outcome of increased competition, she or he should rather take into account firm heterogeneity and a Darwinian-type effect, as in Bernard et al. In Melitz (2003), the *exports* force out the least efficient firms. To the extent that the surviving firms have higher than average markups, the reshuffling of production within sectors could lead to an increase in average PCMs. Another possibility is that exports, targeted at high margin markets, may have driven an increase in markups, which could partially compensate the potential decrease due to deregulations.

5.2. Better financial market efficiency as a convergence force

One cause favouring markup convergence is the improved efficiency of financial markets. Let me outline this idea. Following an arbitrage argument, an investor will choose the sector providing her or him with the best return. For a given sector, the gross rate of return r is:

$$r = \frac{PY - WN - QM}{K} = \frac{PCM}{a_K}.R \qquad (8)$$

a_K being the capital share in output. If financial markets are efficient, the excess return variable $p \equiv r / R = PCM / a_K$ should be equal for every sector: in other words, the assumption of equalised returns across sectors implies that the PCM should be proportional to the capital share in output.[11] This does not mean that PCMs should be equal in every sector, but this creates a strong convergence constraint. To better illustrate this, using data for the USA as an example and average capital shares for each sector, the average excess return p equals *1.7*. If excess returns were equal to this average in each sector - the stylised assumption of capital market efficiency - we could infer the PCM level for each sector *j*, based on the same capital shares, from $PCM_j = \bar{p}.a_{K,j}$. This computation puts forward that in this case, although average PCM would barely change, the dispersion of PCMs would be reduced by slightly less than *50%*. In other words, although these calculations are admittedly rough, they clearly point to the link between capital market efficiency and markup convergence across sectors. The channel is of course the capital mobility from low profit sectors to high profit ones.

Finally, the causes behind the convergence within sector across countries seem fairly straightforward. To the extent that OECD countries are similar, economic integration entails a convergence of markup

[11] Implicitly, the sectoral heterogeneity in terms of risk and depreciation rate of capital is bluntly ignored.

determinants at the sectoral level. Call it globalisation, the increased international trade flows and international capital mobility induce a convergence of markups within sectors.

5.3. Implications for the labour share

One of the reference models pointing to gains from trade remains the reciprocal dumping model of Brander and Krugman (1983).[12] From their theoretical predictions, the pro-competitive effect is expected to reduce the markups and to increase both the real wages and the labour share. This increase in the labour share in OECD countries has been the missing piece in the trade-induced pro-competitive effect puzzle.

A priori, the greater the markup, the lower the labour share in value added, s_L. However, the sensitivity depends on the parameters of the production function and should therefore be measured at the sectoral level. For each sector *j*, based on the estimated markups, the following panel specification is tested:

$$s_{L,it} = q.Logm_{it} + e_i + e_t + u_{it} \qquad (9)$$

where e_i and e_t are country- and time-fixed effects respectively, controlling for relative factor prices, disinflation and potentially biased technical change in particular. One should not read more into equation (9) than an accounting relationship. In particular, there is clearly a problem of simultaneity. Table 5 gives the estimates which are very significant. For all sectors on average, a *1%* increase in markups is associated with a decrease in the labour share of *1.7* points, ranging from *1.1* to *2.4* points depending on the sector.

From 1980, as shown in Table 6 for the ten countries for which data for all the sectors is complete, the manufacturing labour share decreased by 9.7 points of value added on average across countries, of which within-sector changes represent 9.3 points.[13] Based on the estimates of equation (8) and sector weights, the changes in markups reported in Table 2 explain a decrease of 2.8 points on average. Blanchard (1997) estimated that changes in the labour share *for the total economy* were almost exclusively due to biased technical change and not to markup changes. The main limitations in his

[12] In focusing on markups, it is acknowledged that the potential benefits of intensified competition through increased long-term productivity growth are not analysed here.

[13] From the STAN database, the *aggregated* manufacturing labour share in value added has declined by 4.1 on average across by the thirteen countries over the last *three decades*. It has decreased in all thirteen countries except Japan (+19 points), Norway (+3 points) and Austria (flat).

approach come from constraining the production function to the Cobb-Douglas case and from focusing at the country level only. In addition, even he expresses some doubts about these results.[14] Those presented in Table 6 for manufacturing hopefully shed some light on this question.

5.4. Price-cost margin, markup and bargaining power

Up to this point, firms were assumed to be wage-takers. I would now like to introduce wage bargaining and investigate one avenue aiming at reconciling the expected classical link between increased competition and markups - i.e. a negative relationship - with the above results underlining an overall joint increase in PCMs and decrease in labour shares. With g being the bargaining power of workers and W_u the reservation wage, the objective function being maximised in the Nash-bargaining process is classically $[PY-(WN+QM+h.RK)]^{1-g}[(W-W_u).N]^g$. Under the right-to-manage model, firms continue to choose employment based on a given wage, be it negotiated, and real wage remains allocative: first order conditions and all the previously used relations are left unchanged.

Under the efficient bargaining model however, both wages and labour are bargained over simultaneously. This creates a wedge between markups and PCMs, due to workers' rents. Indeed, the first-order conditions and Euler's equation lead to, after some manipulations:

$$W/P=(\partial Y/\partial N)/m+g.(1-1/n).Y/N \qquad (10)$$

$$PY=\frac{n}{1+g.(n-1)}.(WN+h.RK+QM) \qquad (11)$$

Equation (10) states that the wedge between real wages and the marginal product of labour depends not only on product market imperfections but also on the rents captured by workers based on their bargaining power. Equation (11) implies that PCMs are now given by:

$$PCM=(1-g).(1-1/n)+h.a_K \qquad (12)$$

instead of equation (5), which appears as the specific case where workers have no bargaining power. One can easily interpret equation (12). The PCM derived from the data is seen from the point of view of the firm paying the wage *W* which includes the rents kept by workers. PCM refers therefore to the share kept by the firm, hence the term $(1-g)$.

[14] "The great variation in the coefficient across countries […] makes me uneasy about the results", pp 137-138.

The straightforward implication is that when labour market imperfections are ignored, as is the case in most markup estimates, the degree of product market imperfection, as represented by markup over marginal cost, is under-estimated, and even more so the greater the bargaining power.[15] Next, it appears immediately from (12) that PCM can rise even if the true markup , n , is under downward pressure, provided that the bargaining power has been eroded sufficiently.

As for the labour share, to get an order of magnitude, consider the simple Cobb-Douglas case:

$$Y = A.K^{a} N^{b} M^{c}$$

In the efficient bargaining case with capital fixity, the labour share in value added is:

$$s_L = g + (1-g).\frac{b}{m-c}$$

Differentiating the labour share with respect to the markup and the bargaining power yields:

$$\Delta s_L = -\frac{(s_L - g)^2}{b.(1-g)}\Delta m + \frac{1-s_L}{1-g}\Delta g$$

With $b = 0.20, c = 0.70, m = 1.05$ and $g = 0.3$, the model is roughly calibrated according to the observations, as we get $n = m/(b+c) = 1.17, PCM = 0.10, s_L = 0.7$ and output is shared according to: $a_L = 0.233, a_M = 0.667, a_K = 0.06$, the remaining 0.04 being profits. In this case, the labour share evolves according to: $\Delta s_L = -1.14.\Delta m + 0.43.\Delta g$. This example illustrates how a fall in the bargaining power could easily offset a decrease in true markups and trigger a decline in the labour share.

5. Conclusion

The general impact of economic integration and perceived fiercer competition does not fit in with the textbook version of a straightforward decrease in market power: there has been no *common* trend in PCMs at manufacturing sector level over the last decades. More specifically, the results highlight a clear pattern of markup convergence across both sectors and countries, possibly being channelled by

[15] This point is also well noted by Crépon, Desplatz and Mairesse (2002), who innovatively extend Hall's approach to estimate markups and bargaining power on a panel of French firms. They come to a stronger value than that found usually for the bargaining power of around 0.6, leading them to reject the right-to-manage model in favour of the efficient bargaining version.

increased financial market efficiency. In other words, this means that high margins have shrunk *and* low margins grown.

The decrease in the dispersion of PCMs was first noticed by Domowitz, Hubbard and Petersen (1986). The results presented here reinforce the robustness of this trend and suggest that underlying economic forces are behind this pattern. At this stage, economists have not paid enough attention to these changes, nor have they studied the implications in terms of economic theory and welfare.

Since it is difficult to dismiss the perception of more intense competition, these results imply that the decline in market power, consistent with the empirical literature putting forward the pro-competitive effect of increased imports, is counterbalanced by other factors. This paper *suggests* that the exports, the endogenous reactions of firms, the decline in workers' bargaining power and financial deepening, could all play a role. Therefore, theoretical models focusing on the outcomes of increased competition should probably include these ingredients.

Finally, there are at least three directions worth pursuing to deepen the results presented in this study. First and foremost, working with more disaggregated data will refine the estimates since the two-digit level mixes heterogeneous industries in terms of market power. Second, a specification directly identifying the workers' bargaining power would enable us to disentangle the markup from the bargaining power changes. Finally, trying to link the markup trends to those in its structural determinants would enrich the analysis dramatically. These determinants mainly include market structure characteristics (R&D, firm size, competition type), product and labour market regulation and international features.

Appendix: Data description

Sectoral data come from the OECD Structural Analysis (STAN) Database. Table A1 details the 23 manufacturing sectors. Two samples have been built covering thirteen OECD countries' manufacturing industries at the two-digit level for the period 1970-2000, using International Standard Industrial Classification (ISIC), third revision. One has more detailed information but is sparse, as some sectors are missing for a number of countries, and is composed of 138 time series (a country-sector crossing). The other contains more aggregated data but is more balanced with 132 annual time series available out of a total of 143.

The variables are PROD, Production (Gross Output) at current prices ($P.Y$ in the text), LABR, Labour compensation of employees ($W.N$ in the text), VALU, Value added at current prices and for Materials, $Q.M = PROD - VALU$.

Capital : The price of capital, p_k, used in the study is the price of investment calculated from the Gross Fixed Capital Formation at current prices (GFCF) and in volume (GFCFK). When data is not available, the price of the GDP deflator (source OECD Economic Outlook) is chosen for p_k. The user cost of capital is calculated classically according to: $R = p_k.(r + d - \dot{p}_k{}^a)$, where *r* is the interest rate, *d* the depreciation rate and $\dot{p}_k{}^a$ is the expected relative change in the price of capital. By default, *r* was chosen as the long-term interest rate (but an alternative with short-term rate was also tested), the depreciation was fixed at *0.05* (but *0.07* was also tested) and $\dot{p}_k{}^a$ was set at the average of the price change over the last three years. I also tested as *r*, the average of the short-term and the long-term rates, and even a constant for the real interest rate.

Net capital stock (NCAPK) is available directly in the data for Belgium and Italy only. For the other countries, I calculated the series based on the Gross Fixed Capital Formation in volume (GFCFK) according to: $K_t = (1-d).K_{t-1} + GFCFK_t$. Only, the starting point value for the net capital stock is missing to build the series. It was derived differently depending on the countries, due to data availability. For Austria, Finland, Japan, Norway and the USA, I used the Consumption of Fixed Capital (CFC) and inferred: $p_{k0}.K_0 = CFC_0 / d$ for the first date. For Canada, France, the UK, the Netherlands and Sweden, I computed $p_{k0}.K_0 = c.VALU_0.q$. c is the average, for each sector over

time and over countries for which the gross capital stock (CAPK) is available, of $p_k.CAPK/VALU$ and is reported in TableA2. The parameter q reflects the ratio of net capital stock to gross capital stock. I ran simulations based on various methodologies (double-decline, geometric, hyperbolic, see OECD, 2001, Measuring capital. Available at www.oecd.org.) and reasonable values of parameters to arrive at a ratio of between *0.50* and *0.85*. I chose $q = 0.70$ by default, but compared the results with $q = 0.55$. Finally, as Denmark provides gross capital stock only, I used the constant ratio q to deduce net capital stock for all dates. For more details on other series of capital services based on Gross Capital Stock, on the Consumption of Fixed Capital and on various depreciation rates, see Boulhol (2005).

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Table 1: Price and Cycle Effects on Observed Markups from 1980 to 2000 *(a)*

$$Log\left(\frac{PY}{WN+QM}\right)_{ijt} = Log(\mu_0)_{ij} + b_{ij}.(t-t_0) + c_{ij}.(t-t_0)^2 + l_i^{DEFL}.DEFL_{it} + l_i^1.OIL1_{it} + l_i^2.OIL2_{it} + \nu_{ij}^{EMP}.EMPCYC_{ijt} + \nu_i^{GAP}.GAP_{it} + u_{ijt}$$

		PRICE			CYCLE				
country	Number of sectors	DEFL Effect	OIL Effect (b)	**Total Price Effect**	$\bar{\nu}_i^{EMP}$ (c)	ν_i^{GAP}	EMPCYC Effect (c)	GAP Effect	**Total Cycle Effect (c)**
		Parameter Estimate x Change in Variable		**DEFL + OIL effects**	Parameter Estimate		Parameter Estimate x Change in Variable		**EMPCYC + GAP Effects**
aut	11	-0.2%	0.8%***	**0.6%**	-0.08	0.03	0.0%	0.0%	**0.0%**
bel	9	-0.3%	0.4%***	**0.1%**	-0.20	0.16**	-0.4%	-0.1%	**-0.6%**
can	11	1.9%***	0.4%**	**2.3%**	0.16	0.06	-0.2%	-0.2%	**-0.4%**
dnk	11	1.1%**	0.3%	**1.4%**	-0.02	0.09	-0.2%	0.2%	**0.0%**
fin	11	-0.7%	0.7%**	**0.0%**	-0.14	0.09	-0.4%	-0.1%	**-0.5%**
fra	11	0.4%	0.7%***	**1.1%**	-0.13	0.16*	-0.1%	0.0%	**-0.1%**
gbr	11	1.8%***	-0.6%***	**1.1%**	-0.09	0.43***	0.1%	1.5%	**1.6%**
ita	11	2.1%**	0.1%	**2.2%**	-0.15	0.46***	0.5%	-1.8%	**-1.3%**
jpn	6	0.4%	3.8%***	**4.1%**	-0.10	0.21	-0.3%	-0.4%	**-0.8%**
nld	11	0.2%	1.4%***	**1.5%**	0.05	0.29***	0.1%	0.6%	**0.7%**
nor	11	-0.7%*	1.4%***	**0.7%**	-0.08	0.02	0.2%	0.0%	**0.2%**
swe	7	0.9%	0.0%	**0.8%**	-0.16	0.63***	-0.5%	-2.3%	**-2.8%**
usa	11	0.4%	0.8%***	**1.2%**	0.00	0.02	-0.5%	0.1%	**-0.4%**
	132								
mean		**0.6%**	**0.7%**	**1.3%**	**-0.07**	**0.20**	**-0.1%**	**-0.1%**	**-0.25%**

Notes

(a): 1996 for Canada and Sweden, 1998 for the UK. The observation period starts as early as 1970 when data is available. The "Effect" of a given variable is the value of the estimated parameter times the change in the variable over the period. For example, the effect of the change in the GDP deflator (DEFL) in Denmark of 1.1% is $l_{Denmark}^{DEFL} = -0.24$ times the change in the deflator between 1980 and 2000, -0.046.

(b) Significance is based on the joint significance of the two oil parameters.

(c): average across sectors: $\bar{\nu}_i^{EMP} = \underset{j}{Mean}(\nu_{ij}^{EMP})$. Significance is discussed in sub-section 4.4.

(*):Significance at 10%, (**) at 5%, (***) at 1%

Table 2: Estimated Markup Changes between 1980 and 2000 (Equation 7, *h = 0*)*

sector	Austria		Belgium		Canada		Denmark		Finland	
	Mkup n_{1980}	Relative Change $\frac{n_{2000}}{n_{1980}}-1$	Mkup n_{1980}	Relative Change $\frac{n_{2000}}{n_{1980}}-1$	Mkup n_{1980}	Relative Change $\frac{n_{2000}}{n_{1980}}-1$	Mkup n_{1980}	Relative Change $\frac{n_{2000}}{n_{1980}}-1$	Mkup n_{1980}	Relative Change $\frac{n_{2000}}{n_{1980}}-1$
15-16	1.121	6%	1.113	0%	1.108	6%	1.079	-1%	1.094	0%
17-19	1.111	1%	1.037	6%	1.088	2%	1.112	-2%	1.121	3%
20	1.233	-6%	1.111	-2%	1.056	5%	1.128	-1%	1.100	1%
21-22	1.129	7%	1.117	3%	1.140	1%	1.081	5%	1.132	8%
23-25	1.098	13%	1.113	4%	1.073	8%	1.105	10%	1.177	-1%
26	1.178	4%	1.117	5%	1.167	-1%	1.135	2%	1.216	-2%
27-28	1.119	4%	1.060	3%	1.078	-1%	1.084	6%	1.115	2%
29	1.081	6%	.	.	1.127	0%	1.082	2%	1.159	-6%
30-33	1.081	6%	.	.	1.142	-7%	1.087	5%	1.166	7%
34-35	1.093	2%	1.040	0%	1.056	3%	1.034	-2%	1.087	0%
36-37	1.092	7%	1.090	1%	1.094	5%	1.142	-5%	1.212	-9%
mean		**4.6%**		**2.1%**		**1.8%**		**1.8%**		**0.4%**
	France		UK		Italy		Japan			
15-16	1.150	-1%	1.087	4%	1.146	0%	1.144	-11%		
17-19	1.045	7%	1.098	0%	1.197	-4%	.	.		
20	1.120	3%	1.115	2%	1.285	-1%	.	.		
21-22	1.150	-2%	1.075	5%	1.183	0%	.	.		
23-25	1.158	0%	1.119	-1%	1.123	5%	1.168	6%		
26	1.078	12%	1.120	0%	1.280	-7%	.	.		
27-28	1.103	3%	1.049	4%	1.187	-2%	1.138	-1%		
29	1.169	-5%	1.135	2%	1.218	-8%	1.150	-7%		
30-33	1.211	-9%	1.194	-3%	1.225	-9%	1.162	-7%		
34-35	1.022	7%	1.016	4%	1.111	-3%	1.120	-8%		
36-37	1.238	-5%	1.096	6%	1.228	-4%	.	.		
mean		**0.9%**		**1.9%**		**-2.9%**		**-4.8%**		
	Netherlands		Norway		Sweden		USA		All countries	
15-16	1.085	4%	1.059	-1%	1.012	13%	1.070	4%		
17-19	1.129	-4%	1.088	0%	0.971	16%	1.065	0%		
20	1.019	8%	1.098	-4%	.	.	1.178	-5%		
21-22	1.110	5%	1.093	2%	1.079	11%	1.123	0%		
23-25	1.128	1%	1.104	3%	1.086	15%	1.097	10%		
26	1.188	0%	1.161	-1%	1.051	13%	1.078	8%		
27-28	1.096	-1%	1.123	-3%	1.080	9%	1.078	4%		
29	1.064	2%	1.124	-3%	.	.	1.081	-3%		
30-33	1.107	-3%	1.143	-3%	.	.	1.092	6%		
34-35	0.976	6%	1.029	1%	1.133	-1%	1.039	4%		
36-37	1.152	-7%	1.133	-9%	.	.	1.105	4%		
mean		**0.9%**		**-1.5%**		**11.0%**		**3.0%**		***1.4%***

(*): Sector description is given in Table A1.

Table 3: Markup Convergence across Sectors

country	Pearson correlation between $(\Delta n/n)_{2000/1980}$ and n_{1980}
aut	-0.67**
bel	-0.23
can	-0.59**
dnk	-0.16
fin	-0.41
fra	-0.87***
gbr	-0.74***
ita	-0.52*
jpn	0.49
nld	-0.72***
nor	-0.40
swe	-0.82***
usa	-0.45
total	-0.60***

(*):significativity at 10%, (**) at 5%, (***) at 1%

Table 4: Markup Convergence within Sectors across Countries

	Markup average			Markup standard deviation		
sector	1980	2000	Change	1980	2000	Change
15-16	1.097	1.116	+	0.039	0.044	+
17-19	1.089	1.110	+	0.056	0.029	-
20	1.131	1.131	<>0	0.075	0.056	-
21-22	1.118	1.157	+	0.032	0.036	+
23-25	1.119	1.177	+	0.032	0.041	+
26	1.148	1.176	+	0.065	0.030	-
27-28	1.101	1.121	+	0.037	0.033	-
29	1.125	1.109	-	0.047	0.030	-
30-33	1.144	1.132	-	0.050	0.045	-
34-35	1.058	1.069	+	0.047	0.033	-
36-37	1.144	1.129	-	0.058	0.045	-
mean	1.116	1.130	0.014	0.049	0.038	-0.011

(*): Sector description is given in TableA1.

Table 5: Labour Share Sensitivity to Markup

$$s_{L,it} = q.Logn_{it} + e_i + e_t + u_{it}$$

sector	q	Std Error	Nb obs	Adj RSquare
15-16	-2.45	0.10	393	0.88
17-19	-2.04	0.12	364	0.88
20	-1.63	0.15	336	0.76
21-22	-1.01	0.12	364	0.77
23-25	-1.67	0.12	391	0.78
26	-1.62	0.09	361	0.84
27-28	-1.35	0.22	391	0.80
29	-1.27	0.18	271	0.77
30-33	-1.72	0.15	271	0.85
34-35	-2.32	0.16	391	0.78
36-37	-1.35	0.09	336	0.85
mean	-1.67			

Table 6: Contribution of Markup Changes

to Manufacturing Labour Share Changes

	Manufacturing labour share changes from 1980 (% value added)	Within-sectors changes (% value added)*	Contribution of markup changes (% value added)**
aut	-14.5	-15.9	-8.7
can	-11.3	-12.1	-4.5
dnk	-8.9	-7.0	-3.6
fin	-11.3	-4.5	-2.4
fra	-9.4	-9.4	-0.8
gbr	-10.1	-9.8	-2.9
ita	-2.2	-2.1	4.5
nld	-14.5	-13.7	-2.1
nor	-3.4	-2.9	1.2
usa	-11.6***	-15.6	-8.6
mean	-9.7	-9.3	-2.8

(*) Here is the within/between decomposition, with j being sector, t time and k_j sector j share in manufacturing value added.

$$s_{L,t} = \sum_j k_{j,t}.s_{L,j,t} \Rightarrow \Delta s_L = s_{L,T} - s_{L,t} = \sum_j \frac{k_{j,t} + k_{j,T}}{2}.\Delta s_{L,j} + \sum_j \frac{s_{L,j,t} + s_{L,j,T}}{2}.\Delta k_{L,j} = Within + Between$$

(**) $\sum_j \frac{k_{j,t} + k_{j,T}}{2} q_j.(\Delta m_j / m_j)$, q_j coming from equation (8) and Table 5, $(\Delta m_j / m_j)$ from Table 2.

(***) Although the US labour share in total value added did not change much from 1980, the manufacturing labour share decreased sharply over the period. Almost three quarters of this drop comes from the 'Motor Vehicules' and 'Chemicals' sectors. This is consistent with Borjas and Ramey (1995) who find a strong impact of international trade in the automobile industry because rents were high originally.

Table A1: ISIC Rev. 3 Classification

Sector desrciption		More aggregated sample	
15	FOOD PRODUCTS AND BEVERAGES	15-16	FOOD PRODUCTS, BEVERAGES AND TOBACCO
16	TOBACCO PRODUCTS	17-19	TEXTILES, TEXTILE PRODUCTS, LEATHER AND FOOTWEAR
17	TEXTILES	20	WOOD AND PRODUCTS OF WOOD AND CORK
18	WEARING APPAREL, DRESSING, DYING OF FUR	21-22	PULP, PAPER, PAPER PRODUCTS, PRINTING AND PUBLISHING
19	LEATHER, LEATHER PRODUCTS AND FOOTWEAR	23-25	CHEMICAL, RUBBER, PLASTICS AND FUEL PRODUCTS
20	WOOD AND PRODUCTS OF WOOD AND CORK	26	OTHER NON-METALLIC MINERAL PRODUCTS
21	PULP, PAPER AND PAPER PRODUCTS	27-28	BASIC METALS AND FABRICATED METAL PRODUCTS
22	PRINTING AND PUBLISHING	29	MACHINERY AND EQUIPMENT, N.E.C.
23	COKE, REFINED PETROLEUM PRODUCTS AND NUCLEAR FUEL	30-33	ELECTRICAL AND OPTICAL EQUIPMENT
24	CHEMICALS AND CHEMICAL PRODUCTS	34-35	TRANSPORT EQUIPMENT
25	RUBBER AND PLASTICS PRODUCTS	36-37	MANUFACTURING NEC; RECYCLING
26	OTHER NON-METALLIC MINERAL PRODUCTS		
27	BASIC METALS		
28	FABRICATED METAL PRODUCTS, except machinery and equipment		
29	MACHINERY AND EQUIPMENT, N.E.C.		
30	OFFICE, ACCOUNTING AND COMPUTING MACHINERY		
31	ELECTRICAL MACHINERY AND APPARATUS, NEC		
32	RADIO, TELEVISION AND COMMUNICATION EQUIPMENT		
33	MEDICAL, PRECISION AND OPTICAL INSTRUMENTS		
34	MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS		
35	OTHER TRANSPORT EQUIPMENT		
36	MANUFACTURING NEC		
37	RECYCLING		

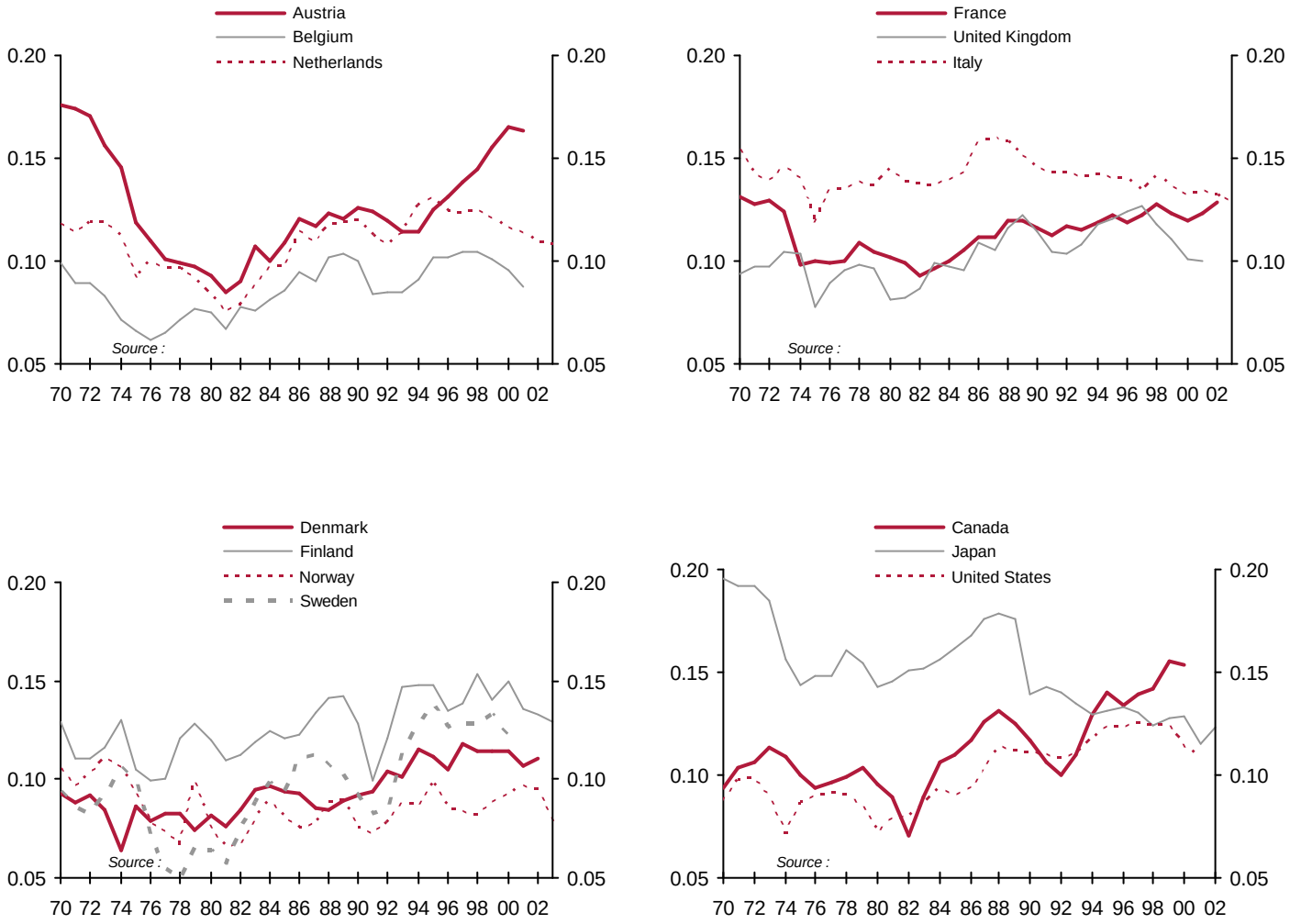
Table A2: Computation of initial capital stock for each sector:

Average over time and countries (Belgium, Canada, Finland, France and Italy) of

$p_k.CAPK/VALU$

sector	c
15-16	2.75
17-19	2.07
20	3.91
21-22	2.89
23-25	3.31
26	3.15
27-28	3.14
29	1.52
30-33	1.52
34-35	2.39
36-37	2.55

Figure 1: Observed Price-Cost Margin at Aggregated Manufacturing Level



Source: OECD STAN Database, Author's calculations

Figure 2A
France: Convergence in Observed Price-Cost Margins

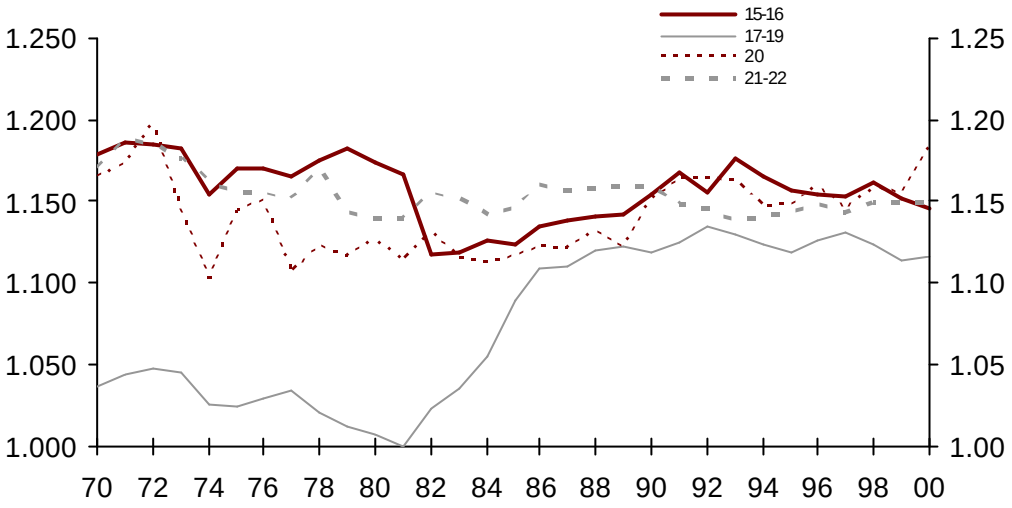


Figure 2B
France: Convergence in Observed Price-Cost Margins

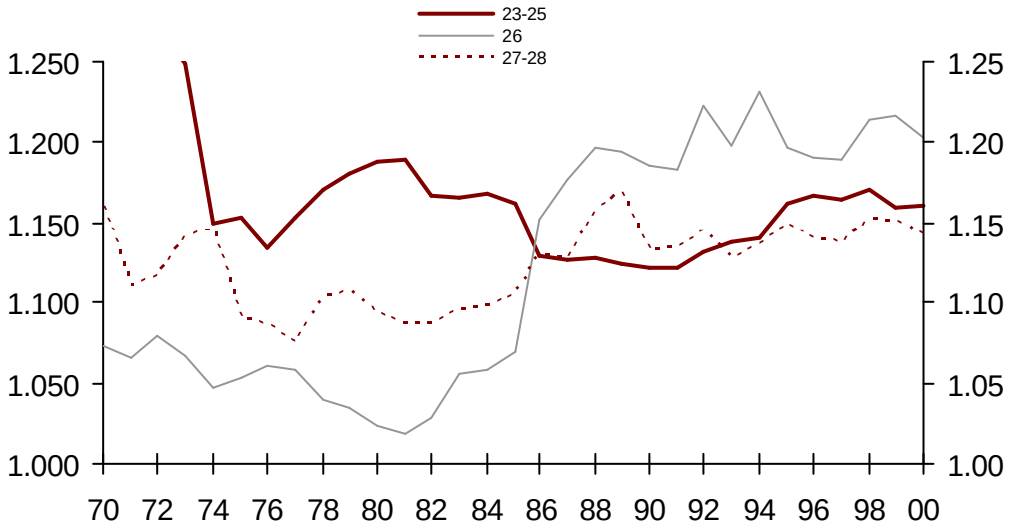


Figure 2C
France: Convergence in Observed Price-Cost Margins

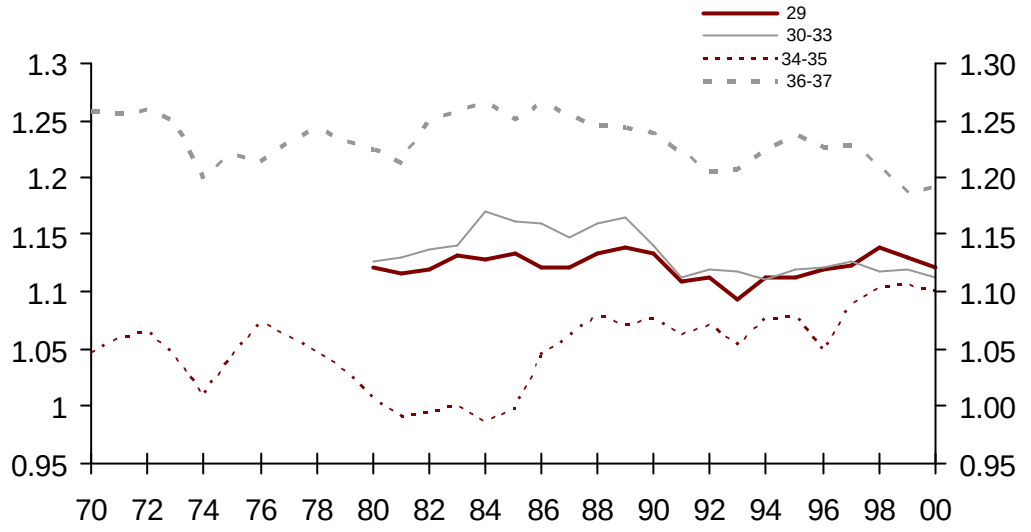
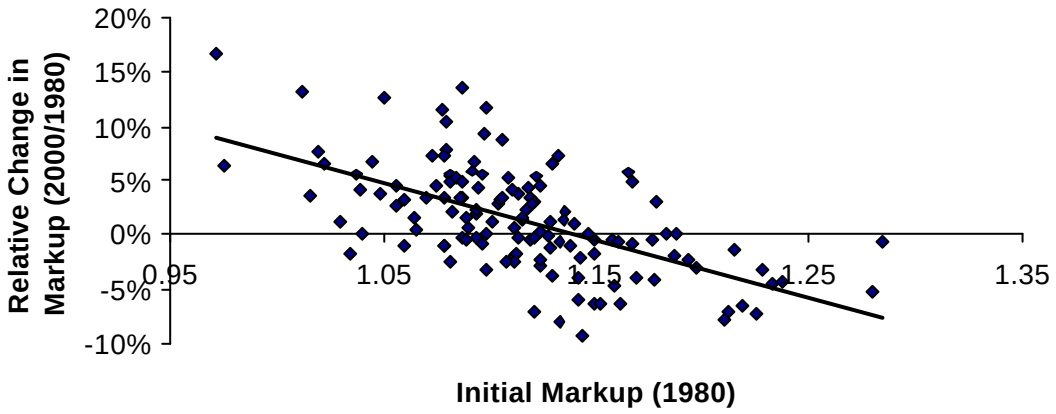


Figure 3
Convergence in Markups



Each diamond represents one of the 132 (country x sector) couples